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sugar; coir, a commercial name for the fiber obtained from the husk of the coco-nut; copra, the desiccated kernel or oil-cake; and oil.—J. M. C.

Cocoa.—The important cultural plants of the tropics are gradually becoming known from the modern standpoint, and the most recent contribution in this field is the large volume on cocoa by VAN HALL,[5] director of the institute for plant diseases and cultures at Buitenzorg, Java. In the brief historical account it is stated that the first knowledge and use of the plant came to Europe in connection with the conquest of Mexico, where Cortez found it in extensive cultivation under the name "cacao," as he reported it. Some conception of the kind of scientific data included in such a study of an important cultural plant may be obtained from some of the titles of the chapters, such as Geographical distribution and climatic conditions, Chemistry of cocoa and cocoa soils, Botanical characteristics of the cocoa plant, Varieties of cocoa, Cultivation of cocoa, Fermentation, Diseases and enemies, Cocoa-growing countries.—J. M. C.

Flora of California.—Part 5 of *A flora of California* by JEPSON[6] has just appeared. The first parts were noticed in this journal,[7] attention being called to the general high character of the work. This part completes the Portulacaceae, includes the Caryophyllaceae, and begins the Ranunculaceae. A new genus of Caryophyllaceae is proposed (*Eremolithia*), based upon *Achyronychia Rixfordii* Brandegee.—J. M. C.

NOTES FOR STUDENTS

The gases in the floats of marine algae.—This subject has attracted the attention of a number of investigators during recent years. The fact that it is being investigated from so many points of view gives hope that we may soon have fairly complete knowledge of the subject. LUCAS[8] has investigated the subject from the point of view of the origin of the gas. The following Australian marine algae have vesicles filled with gas: Sargassaceae (*Sargassum*, *Carpophyllum*, *Turbinaria*, *Cystophora*, *Cystosira*, *Scaberia*, *Phyllospora*), Fucaceae (*Hormosira*), and Laminariaceae (*Macrocystis* and possibly *Adenocystis*). In young plants, and even in mature fruiting individuals in sheltered situations in shallow water, there are no vesicles.

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[5] VAN HALL, Dr. C. J. J., Cocoa. 8vo. pp. xvi+515. *figs. 140.* London: Macmillan. 1914. 14*s*.

[6] JEPSON, W. L., A flora of California. Royal 8vo. Part V, pp. 465–528. *figs. 14.* San Francisco: H. S. Crocker Co. 1914.

[7] BOT. GAZ. **49**:153. 1910.

[8] Lucas, A. H. S., The gases present in the floats of certain marine algae. Proc. Linn. Soc. New South Wales **36**:626–631. 1912.

There seem to be three possible sources of the gas in these vesicles: (1) atmospheric air, (2) the gases dissolved in the sea water, and (3) gases produced in the metabolism of the plants themselves. He excludes (3) because he has "never detected any gases beyond nitrogen and oxygen in the floats," and "it is hardly conceivable that any process of metabolism should yield these two gases only without any carbon compounds." He excludes (1) because his analyses (table I) do not show the nitrogen and oxygen in the vesicles to be in the proportion that they are in atmospheric air (79:21), and because the gas must be formed in the cavity *pari passu* with its growth, otherwise the vesicles would collapse.

TABLE I

ANALYSIS OF GASES IN THE FLOATS OF ALGAE

Species	Percentage of nitrogen	Percentage of oxygen	Comments
Phyllospora comosa (1).....	86.0	14.0	Fresh-looking plants cast up on the shore
" " (2).....	89.4	10.6	Just cast up
" " (3).....	88.9	11.1	" " "
" " (4).....	82.3	17.7	" " "
" " (5).....	83.2	16.8	" " "
Hormosira Banksii (1).....	88.46	11.54	Growing
" " (2).....	88.0	12.0	Same gathering kept a day longer
Cystophora monilifera......	80.0	20.0	Floating in the sea

TABLE II

ANALYSIS OF GAS OBTAINED BY BOILING IT OFF FROM WAVE-WATER FROM THE OCEAN

	(*a*)	(*b*)
Nitrogen..................	67.12	58.33
Oxygen...................	26.03	30.55
Carbon dioxide............	6.85	11.11

He notes that in the analyses of surface waters collected by the "Challenger" the proportion of nitrogen to oxygen varied around a mean of 2:1, and that this would be expected from the relative solubility of the two gases.

He accepts (2), although his table does not show the proportion of nitrogen and oxygen to be the proportion that he has found in sea water gas (table II), and although he finds considerable carbon dioxide in sea water gas and none in the gas from vesicles. He observes that the presence of organisms seems to alter the natural ratio of the gases dissolved from the air. He believes that the gas enters, dissolved in the water, by osmosis, and that just as marine algae show a marked preference for potassium sulphate and commonly reject much of the sodium chloride, so they may show a marked preference for oxygen, and the useless nitrogen together with the oxygen not required may be eliminated and set free in the floats "in order to serve a mechanical purpose." He suggests that since the proportion of oxygen in the vesicles is less than in atmospheric air or in air dissolved in sea water, the plant must use up some of the oxygen "for other purposes than levitation." This last suggestion evidently means that the gas is modified by the metabolism of the tissues through which it passes.

In regard to (3) we shall await with interest to see whether the absence of carbon dioxide from the floats of marine algae is confirmed by other workers on other species.

On the whole, the paper is a clear, clean-cut statement of the problem and of the results of the investigation, although in a few places its scientific value might be improved by assuming a less teleological point of view.—GEORGE B. RIGG.

Cecidiology.—Among the American papers by botanists is one by STEWART[9] on the gall caused by *Andricus punctatus* Bassett. The author has made a very careful study of the histology of the gall, which he has compared with the histology of tissues formed in the healing of wounds. In his summarization on this point he says:

> The following conditions in this gall can be correlated with similar conditions in traumatic tissue: (1) a recapitulation of similar conditions of ray structure; (2) a vertical shortening of the broad rays; (3) the presence of ball-formations in the wood, which appear only in tangential sections; (4) a parting of the fibers in the vicinity of the larval chambers, similar to the condition resulting from longitudinal wounds; (5) isodiametric parenchyma cells around the base of the larval chambers with irregularly distributed fibers and other woody elements among them; (6) a great reduction in the number, or an entire lack of vessels; (7) a shortening of many of the cells of the wood; (8) absence of distinct annual rings of growth; (9) a suggestion of the return of the cambium to normal activity after a time; (10) woody inclusions in the bark.

Unfortunately, the bibliography is not satisfactory in that it includes some papers which have much less bearing on the subject than certain papers which are not included. Also, some of the statements in the first part of the paper concerning our knowledge of the anatomy of galls are misleading. The reviewer also questions the statement of the title of the paper, in that the inclusion of the generic name of the gall insect would have made the title much more suggestive to those who may wish to become informed on the literature of the subject. However, the author has brought out a number of points which are frequently overlooked by students of abnormal plant growths.

Another very excellent paper is by LUTMAN[10] on club root, in which the author discusses the relation of *Plasmodiophora Brassicae* to its hosts and the

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[9] STEWART, ALBAN, Notes on the anatomy of the *punctatus* gall. Amer. Jour. Bot. 1:531–546. *pls. 2.* 1914.

[10] LUTMAN, B. F., Studies on club root. Univ. Vermont, Bull. 175. pp. 27. 1913.